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Frequency of Subdural and Epidural Hematoma in Brain Injury Via Computed Tomography in Trauma Center of DHQ Teaching Hospital Sargodha

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Abstract:
At least 10 million TBIs serious enough to result in death or hospitalization occur annually. The mortality associated with acute subdural hematoma has been reported to range from 36-79%. Epidural hematoma occurs in approximately 2% of patients with head injuries and 5–15% of patients with fatal head injuries. Both can be caused by fall, motor vehicle crashes, assaults, blasts and sports activities. CT is best modality for diagnosis of brain injury. **Objective:**To measure the frequency of subdural and epidural hematoma in brain injury via computed tomography in trauma center of DHQ Teaching Hospital Sargodha.**Methodology:**In this descriptive study, among 137 patients of traumatic brain injury (TBIs) were selected with age and gender discrimination by convenient sampling, at Department of Radiology, DHQ Teaching Hospital Sargodha. Single slice Computed Tomography Toshiba asteion machine was used.**Results:**Out of 137 patients collected, 35 were females and 102 were males who visited emergency department due to brain Injury. It shows 25.5% were females and males were 74.5%.Out of 137 patients, 63.5% were injured with RTA and 35.8% came with the history of fall. 67.2% patients present with loss of consciousness, 67.9% patients with skull fractures and 73% with swelling. Out of 137 patients 85.4% develop SDH and 14.6% develop EDH. **Conclusion:**In this study we conclude that male develop larger number of brain injuries than females. Most patients with history of RTA had epidural hematoma. Females most likely develop subdural hematoma. Most patients with brain injury later develop subdural hematoma.
Keywords: Subdural Hematoma, Epidural Hematoma, Traumatic Brain Injury(TBI), Road Traffic Accident(RTA)
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INTRODUCTION

Polytrauma due to road traffic accidents (RTA) is a leading cause of brain injury in teenagers and young adults.[1]TBI may arise from physical damage by external blunt or penetrating trauma to the head, skull, dura, or brain or from acceleration-deceleration movement such as whiplash or coup-contrecoup, resulting in tearing or shearing of nerve fibers and bruising or contusion of the brain against opposite sides of the skull. Scraping of the brain across the rough bony base of the skull can cause contusion and can also affect the olfactory, oculomotor, optic, and acoustic nerves, leading to anosmia (total loss of the sense of smell, reduction of taste), double and/or blurred vision, and dizziness and/or vertigo.[2] At least 10 million TBIs serious enough to result in death or hospitalization occur annually. An expected 57 million individuals worldwide have been hospitalized with at least 1 TBI, however the rate of living with TBI-related disability is still unknown. In the United States, an average of 1.4 million TBIs occur per year, including 1.1 million trauma centre visits, 235,000 hospitalizations, and 50,000 mortality rate. The main sources of TBI are falls, engine vehicle crashes, struck by or against occasions, and attacks, separately Blasts are a main source of TBI among dynamic obligation military work force in war zones.[3] Sportsrelated TBI is an important public health problem because of the large number of people affected and the potential for serious sequelae, Brain injuries not only represent a serious disability for those involved but also place an enormous burden on society, often exacting a heavy economical, social, and emotional price. Since a cure is not attainable at this time, the only alternative is to develop intervention strategies to prevent or minimize these injuries.[4]

Intracerebral hemorrhage (ICH) is associated with 40% early mortality and 80% disability. Hematoma expansion (HE) is a major determinant of early deterioration and death.[5]Head Injury can be defined as, "a morbid situation, resulting from gross or ultra fine structural changes of the skull and its contents.[6] The meninges are major connective tissue envelop that contribute the brain. Their salient features are to provide a protective coating to the blood brain barrier (BBB).[7] There are two major types of hematoma named as subdural hematoma and epidural hematoma. Subdural Hematoma can arise either at the anterior or contracoup site. It is most commonly occur at the contracoup site. Any damage or injury to the superficial bridging veins results in the accumulation of blood between dura and arachnoid matter. SDHs usually found above the cerebral convexities, across the tentorium cerebella, and across the falxcerebri, in descending order of frequency.[8]The classic CT appearance of an acute SDH is a crescent shaped homogeneously hyper dense extra axial collection that spreads diffusely over the affected hemisphere. With bilateral SDH, there may be no midline shift, and the cortical sulcal spaces are symmetrically effaced.[9]

Epidural hematoma is comparatively rare occurring as a consequence of head trauma. A trauma to the skull and the underlying meningeal vessels results in the formation of EDH. It is not because of brain damage.[10]The peak incidence of EDH is in the second decade, and the mean age of patients with EDH is between 20 and 30 years of age. EDH is a rare entity in patients older than 50 to 60 years of age. In pediatric patients, the mean age of patients harboring EDH is between 6 and 10 years and EDH is less frequent in very young children and neonates. EDH can result from injury to the middle meningeal artery, the middle meningeal vein, the diploic veins, or the venous sinuses. Historically, bleeding from the middle meningeal artery has been considered the main source for EDH.[11]Computed tomography (CT) is the standard initial diagnostic tool for patients with blunt trauma with suspected head injury. Once an intracranial abnormality has been identified on CT scan, patients are admitted to the hospital for observation, monitoring, and potentially medical and surgical therapy for severe injuries.[12] With this study we will measure the frequency of different types of hematoma results from brain injury in our population so that appropriate management can be selected for the patient.

Methods:

In this descriptive study, among 138 patients of traumatic brain injury (TBIs) were selected with age and gender discrimination by convenient sampling, at Department of Radiology, DHQ Teaching Hospital Sargodha. Single slice Computed Tomography Toshiba asteion machine was used. The patients were included in this study if they had a clinical evidence of trauma above clavicles. Patients who have contraindications to CT machine i.e pregnancy and brain tumor were excluded.

RESULTS

Out of 137 patients collected, 35 were females and 102 were males. 87 out of 138 were injured due to RTA. 92 patients were presented with LOC. 49 were injured due to fall. 93 had fracture and 100 had swelling. 117 patients had SDH and 20 had EDH.

	Frequency	Percent
F	35	
M	102	74.5
Total	137	100.0

Table 1: Frequency Distribution of Gender

Table 2 shows out of 137 patients 13 patients (14.9%) develop EDH who injured due to road traffic accident.

			Epidural Hematoma		
			No	Yes	Total
Road Traffic Accide	No	Count	43	7	50
		% within RTA	86.0%	14.0%	100.0%
	Yes	Count	74	13	87
		% within RTA	85.1%	14.9%	100.0%
Total		Count	117	20	137
		% within RTA	85.4%	14.6%	100.0%

Table 2: Frequency Distribution of RTA* EDH Crosstabulation

Table 3 shows out of 137 patients 74 (85.1%) patients develop SDH who injured due to RTA.

			Subdural Hematoma		Total
			No	Yes	
Road Traffic Accident	No	Count	7	43	50
		% within RTA	14.0%	86.0%	100.0%
	Yes	Count	13	74	87
		% within RTA	14.9%	85.1%	100.0%
Total		Count	20	117	137
		% within RTA	14.6%	85.4%	100.0%

Table 3: Frequency Distribution of RTA* SDH Crosstabulation

Table 4 shows out of 137 Patients 7 patients (14.3%) develop EDH who came with history of fall.

			Epidural Hematoma		Total
			No	Yes	
Fall	No	Count	75	13	88
		% within fall	85.2%	14.8%	100.0%
	Yes	Count	42	7	49
		% within fall	85.7%	14.3%	100.0%
Total		Count	117	20	137
		% within fall	85.4%	14.6%	100.0%

Table 4: Frequency Distribution of Fall* EDH Crosstabulation

Out of 137 patients 42 patients (85.7%) develop SDH who came with the history of fall as shown in table 5.

			Subdural Hematoma		Total
			No	Yes	
Fall	No	Count	13	75	88
		% within fall	14.8%	85.2%	100.0%
	Yes	Count	7	42	49
		% within fall	14.3%	85.7%	100.0%
Total		Count	20	117	137
		% within fall	14.6%	85.4%	100.0%

Table 5: Frequency Distribution of Fall* SDH Crosstabulation

Table 6 shows out of 137 patients 2 were female (5.7%) who develop EDH and 18 were male (17.8%) who develop EDH.

			Epidural Hematoma		Total
			No	Yes	
Gender	F	Count	33	2	35
		% within gender	94.3%	5.7%	100.0%
	M	Count	84	18	102
		% within gender	82.4%	17.6%	100.0%
Total		Count	117	20	137
		% within gender	85.4%	14.6%	100.0%

Table 6: Frequency Distribution of Gender* EDH Crosstabulation

Table 7 shows out of 137 patients 33 were female (94.3%) who develop SDH and 84 were male (82.4%) who develop SDH.

			Subdural Hematoma		
			No	Yes	Total
Gender	F	Count	2	33	35
		% within gender	5.7%	94.3%	100.0%
	M	Count	18	84	102
		% within gender	17.6%	82.4%	100.0%
Total		Count	20	117	137
		% within gender	14.6%	85.4%	100.0%

Table 7: Frequency Distribution of Gender* SDH Crosstabulation

Discussion

Out of 137 patients collected, 35 were females and 102 were males who visited emergency department due to brain Injury. It shows 25.5% were females and males were 74.5%.Out of 137 patients, 63.5% were injured with RTA and 35.8% came with the history of fall. 67.2% patients present with loss of consciousness, 67.9% patients with skull fractures and 73% with swelling. Out of 137 patients 85.4% develop SDH and 14.6% develop EDH. A cross-sectional observational investigation Gupta Prashant K, et.al included 382 patients with head damage who were conceded in the crisis branch of a multispecialty tertiary consideration clinic, from September 2008 to September 2010. The regular age gathering was between 20-50 years (70.9%), and under 13% were older (> 60years) patients. Males had higher frequency of head injury than females (306 versus 76). Cerebral edema was recognized in 63.4% of the cases, trailed by skull break (62%), hemorrhagic injury (46.3%), and epidural hematoma (30.4%). Epidural hematoma was available in temporo-parietal district in 48.0% patients, 32% in frontal area, and 20% in parieto-occipital locale. In about portion of the patients, intracerebral hematoma was available in the frontal area.[1] Johannes Leitgeb, M.D., et.al conducted a study. There were 863 data sets in the database. Of these, outcome was not recorded in 18 patients, 9 patients died prior to ICU admission, and 98 patients had only moderate TBI (GCS scores of 9–12 after admission); this left 738 patients for analysis. Of these, 360 (48.8%) had an acute SDH on their CT scan and were selected for this analysis. Demographic data for the 2 groups of patients are given in Table 1. About 70% of the patients were male, and there was no significant difference between the groups. Sex had no effect on outcome, although female patients were significantly older than males. There was a significant effect of age; patients who survived were significantly younger. Fifty-six percent of the patients who died (94 of 168 patients) were older than 60 years of age. There was a significant increase in mortality rates (from 25% to 63%) with increasing age. With regard to trauma mechanism, there were no significant differences, although the rate of low-level falls was higher in non survivors.[13]

Conclusion

In this study we conclude that male develop larger number of brain injuries than females. Most patients with history of RTA had epidural hematoma. Females most likely develop subdural hematoma. Most patients with brain injury later develop subdural hematoma.

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